

SPECIFICATIONS

FOR

WASHINGTON EDU PROJECT

**SERVICE HOIST SYSTEM IN A
25 FEET DIAMETER SHAFT TO CARRY A
30,000 LB LOAD WITH A SECOND CAGE TO CARRY A
2000 LBS MANLOAD**

PREPARED BY

**FKC-LAKE SHORE
EVANSVILLE, INDIANA.**

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HEADFRAME

The headframe will be designed to accommodate the loadings from the two ground mounted hoists with considerations for all dead, live and wind loads, and will be in accordance with the AISC specifications for the design, fabrication and erection of structural steel for buildings, latest edition. The structure is designed for a 100 percent impact factor on lifted loads.

The main headframe columns are designed to rest on the shaft collar with the back legs to rest on individual foundations between the shaft and the hoist.

The headframe is approximately 80 feet high to the machinery deck for the hoist. The headframe will be fabricated from A-36 steel and will include a stairway with handrails to access the machinery decks.

The headframe will be completely enclosed with fencing with swinging gates on two (2) ends for access to the cage and one side access to the counterweight for the cargo container and with one gate for the normal access/ access cage.

The headframe design includes headframe cage retarders and catch gear to arrest the cage in case the cage over travels at speed into the headframe.

MAN AND EQUIPMENT CAGE – CONTAINER EQUIPMENT

The man and equipment cage will be a single deck cage with an overall height of approximately 16 feet. The cage has a capacity of 30,000 pounds for the maximum material load. The cage will consist of a man deck with a roof 12 feet above the deck and a crosshead to couple the cage to the hoist rope. The cage will be guided through the shaft by four (4) 85 lb rails attached to the buntion beams. The cage weighs approximately 29, 000 lbs.

The cage will be designed for a 100 percent impact factor on dead and live loads.

The cage consists of a deck sized to maximize the available shaft area with suitable running clearances. The deck shall be provided with heavy-duty floor plate. The ends of the car will also be strengthened. Skid rails 3/8" high are provided on the deck plate for ease of loading and unloading supplies. The deck is 22' 0" long x 10' 4" wide, and 10' 6" face to face of the guides. The effective width inside the cage is approximately 9'6". The cage has gates on each end for man containment. The cage sides shall be expanded metal except for the bottom 18 inches which shall be 1/4" steel plate. All tension members are fastened with structural bolts and any welding utilized shall be designed to avoid stress concentrations

The guide roller units have FKC-Lake Shore 10" diameter wheels. The cage will be equipped with eight (8) units, each unit consisting of Two (2) rollers mounted to a common bracket. The bracketing provides each roller with individual adjustment.

The 10" diameter solid tires are equipped with anti-friction bearings, labyrinth seals and hub. Back-up guide shoes are included with easily removable wear bars for both guide face and side surfaces. The back-up guide shoes are gauged properly to prevent undue deflections or forces being transmitted to the roller assemblies in case of unforeseen guide irregularities or roller failure.

The cage is equipped with connection holes for the short-coupled thimble.

The cage will be fabricated in sections to facilitate handling and shipping.

MAN AND EQUIPMENT CAGE – EGRESS / EQUIPMENT

The egress cage will be a single deck cage with an overall height of approximately 14 feet. The cage has a capacity of 2,000 pounds for the maximum material/man load. The cage will consist of a man deck with a roof 10 feet above the deck and a crosshead to couple the cage to the hoist rope. The cage will be guided through the shaft by two (2) 60 lb rails attached to the buntion beams. The cage weighs approximately 6,000 lbs.

The cage will be designed for a 100 percent impact factor on dead and live loads.

The cage consists of a deck sized to maximize the available shaft area with suitable running clearances. The deck shall be provided with heavy-duty floor plate. The deck is 8' 0" long x 3' 0" wide, and 8' 6" face to face of the guides. The cage has gates on one end for man containment. The cage sides shall be expanded metal except for the bottom 18 inches which shall be ¼" steel plate. All tension members are fastened with structural bolts and any welding utilized shall be designed to avoid stress concentrations

The guide roller units have FKC-Lake Shore 10" diameter wheels. The cage will be equipped with four (4) units, each unit consisting of Three (3) rollers mounted to a common bracket. The bracketing provides each roller with individual adjustment. The 10" diameter solid tires are equipped with anti-friction bearings, labyrinth seals and hub. Back-up guide shoes are included with easily removable wear bars for both guide face and side surfaces. The back-up guide shoes are gauged properly to prevent undue deflections or forces being transmitted to the roller assemblies in case of unforeseen guide irregularities or roller failure.

The cage is equipped with connection holes for the short-coupled thimble.

COUNTERWEIGHT CONTAINER LOAD

The counterweight will be designed to operate on two (2) 60 lb rail guides and will weigh 44000 lbs.

The counterweight will be of fabricated steel construction and includes guide roller units that have FKC-Lake Shore 8" diameter wheels. The counterweight will be equipped

with four (4) units, each unit consisting of Two (2) rollers mounted to a common bracket. The bracketing provides each roller with individual adjustment. The 8" diameter solid tires are equipped with anti-friction bearings, labyrinth seals and hub. Back-up guide shoes are included with easily removable wear bars for both guide face and side surfaces. The back-up guide shoes are gauged properly to prevent undue deflections or forces being transmitted to the roller assemblies in case of unforeseen guide irregularities or roller failure.

TOTAL SERVICE SHAFT STEEL AND GUIDES

The bunton beams are attached to the shaft wall with top and bottom support brackets, the support brackets are fastened to the shaft wall with screw type anchors.

The stub beams for the counterweight guides are welded to the main bunton beams. The buntons for the 3' x 8' cage are bolted to the main buntons and fastened to the shaft wall using mounting brackets.

The bunton beams are on 12'-0" vertical spacing. A typical bunton set weighs approximately 2400 lbs.

Four rail guides are furnished for the cage and two rail guides are furnished for the counterweight. The guide rails for the cage are 85 lb rail and for the counterweight 60 lb rail. The two guide rails for the egress cage are 60 lb rails.

In the sump area, sufficient support steel for the cage guides will be included. Chain link fencing material will be included around the sump area at the mine level. A swinging gate provides access to either end of the cage and to the counterweight. A swinging gate also provides access to the egress cage.

SHEAVES

FKC-Lake Shore will furnish two 12 feet diameter lined sheaves for the container cage and counterweight. The sheaves will be of fabricated construction lined with replaceable T1 liners. The bearings will be designed for a minimum 100,000 hours L10 life.

FKC-Lake Shore will furnish One 6 feet diameter sheaves for the egress cage. The sheaves will be of fabricated construction lined with replaceable T1 liners. The bearings will be designed for a minimum 100,000 hours L10 life.

HOIST ROPE ATTACHMENTS

Two 1.75" FKC-Lake Shore short-coupled thimbles are included along with chase blocks, connecting links and pins for the container cage and the counterweight. A 0.75" single short coupled thimble will be furnished for the egress cage.

CAGE AND COUNTERWEIGHT RETARDERS

FKC-Lake Shore will furnish for this package, Cage and Counterweight retarders in the headframe and in the sump area to arrest the cage in an overspeed condition.

CATCH GEAR

FKC-Lake Shore will furnish for this package, Cage and Counterweight catch gear in the headframe to prevent a cage from falling down the shaft if a rope breakage occurs due to an overwind situation.

DESIGN ENGINEERING

FKC-Lake Shore will provide the necessary design engineering for its portion of the service shaft system. We will work closely with the shaft sinking contractor and owner to provide a workable hoisting system.

STRUCTURAL STEEL PAINTING INSTRUCTIONS

This specification covers FKC-Lake Shore standard painting & coating procedure for the structural steelwork used in the construction of the bunton sets.

One (1) Coat Induron "Ruff Stuff 2100" Coal Tar Epoxy 12 mil thickness

Surface Preparation

Remove all loose mill scale, rust and dirt and white metal blast (SSPC-SP-5) all surfaces. Greasy or oily surfaces must be cleaned with a suitable solvent to provide a clean dry surface.

Application of "Ruff Stuff 2100" Coal Tar Epoxy

Mask-off bolted connections 3" from all bolt holes.

Apply one (1) coat "Ruff Stuff 2100" Coal Tar Epoxy as manufactured by Induron. Thinning and application procedures shall be in accordance with paint manufacturer's recommendations.

The headframe, cage, counterweight, rope attachments and shaft guides will be painted with a two-coat epoxy paint or equivalent system.

Surface Preparation

Remove all loose mill scale, rust and dirt and white metal blast (SSPC-SP-5) all surfaces. Greasy or oily surfaces must be cleaned with a suitable solvent to provide a clean dry surface.

Primer: one coat 2-3 mils DFT

Finish: one coat 5-8 mils DFT

Hoist - Container load

The hoist for the container load will be a double drum hoist with each drum 144" diameter x 62" wide. The hoist is designed for a 1.875" rope and is capable of spooling the rope for the final depth of 4250 feet on four layers. The initial stage will require 2+ layers. The hoist will be fitted with a Lebus groove to aid with proper rope spooling. The hoist drum will be fabricated with brake discs for the caliper brakes.

The hoist will be complete, including a set of rope coiling sleeves, bed plates for the bearings, white metal bearings with housings, lube & HP jacking system, forged steel drum shaft with center hole, gearbox, coupling bolts, dual clutch assemblies, disc brake stands, disc brake units and guards, 4 channel brake hydraulic system, escort braking system and motors.

We have selected a maximum speed of 600 feet/min for this hoist which will require around a 1000 HP motor. It is possible to go to a 1000 feet per min system but this will require around a 1500 HP motor and will increase the price for the hoist.

Hoist – Egress/emergency

The hoist for the egress cage will be a single drum hoist 60" diameter x 60" wide. The hoist is designed for a 0.75" diameter rope and is capable of spooling the rope for the final depth of 4250 feet on four layers. The initial stage will require 2+ layers. The hoist will be fitted with a Lebus groove to aid with proper rope spooling. The hoist drum will be fabricated with brake discs for the caliper brakes. One set of brakes will be furnished on the main drum with the second set located between the motor and gearbox. The speed selected is 600 feet per minute and this will require a 250 H.P. Motor.

Budget Cost for the service shaft systems is \$14,111,810.00. This includes the two hoists, the two cages, the hoist ropes, all the shaft steel, landing steel and sump steel, the headframe, sheaves and installation of the supplied equipment.